

## Fast Switching EmCon<sup>®</sup> Diode

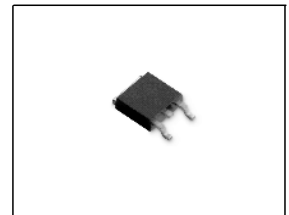
### Feature

- 600 V EmCon<sup>®</sup> technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- 175°C operating temperature
- Easy paralleling

### Product Summary

$V_{RRM}$	600	V
$I_F$	15	A
$V_F$	1.45	V
$T_{jmax}$	175	°C

P-TO252-3-1.



Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDD15E60	P-TO252-3-1.	Q67040-S4380	D15E60	NC	C	A

### Maximum Ratings, at $T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	$V_{RRM}$	600	V
Continuous forward current	$I_F$	15	A
$T_C=25\text{ °C}$		29.2	
$T_C=90\text{ °C}$		19.6	
Surge non repetitive forward current	$I_{FSM}$	60	
$T_C=25\text{ °C}$ , $t_p=10\text{ ms}$ , sine halfwave			
Maximum repetitive forward current	$I_{FRM}$	45	
$T_C=25\text{ °C}$ , $t_p$ limited by $T_{jmax}$ , $D=0.5$			
Power dissipation	$P_{tot}$	83.3	W
$T_C=25\text{ °C}$		83.3	
$T_C=90\text{ °C}$		47.2	
Operating and storage temperature	$T_j, T_{stg}$	-55...+175	°C
Soldering temperature	$T_S$	255	°C
for 10 s (according to JEDEC J-STD-020A)			

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.8	K/W
SMD version, device on PCB:	$R_{thJA}$				
@ min. footprint		-	-	75	
@ 6 cm <sup>2</sup> cooling area <sup>1)</sup>		-	-	50	

**Electrical Characteristics**, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Reverse leakage current	$I_R$				$\mu\text{A}$
$V_R=600\text{V}, T_j=25^\circ\text{C}$		-	-	50	
$V_R=600\text{V}, T_j=150^\circ\text{C}$		-	-	1250	
Forward voltage drop	$V_F$				V
$I_F=15\text{A}, T_j=25^\circ\text{C}$		-	1.45	2	
$I_F=15\text{A}, T_j=150^\circ\text{C}$		-	1.45	-	

<sup>1)</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air.

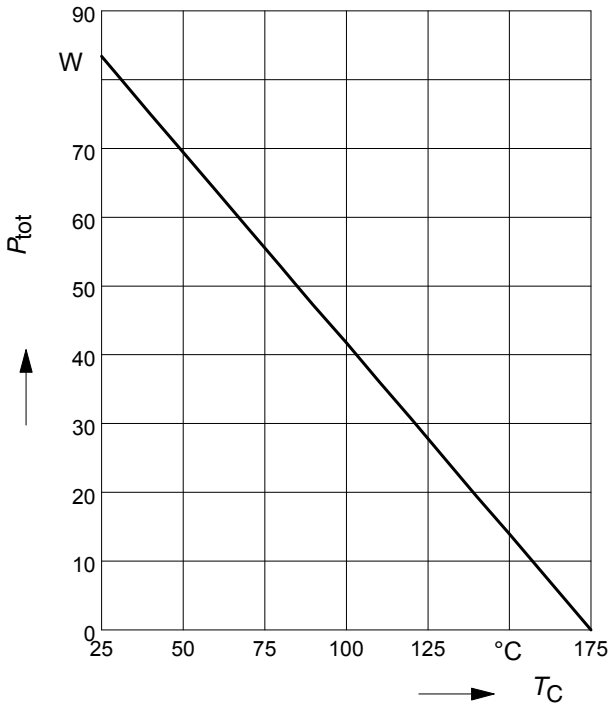
**Electrical Characteristics**, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Reverse recovery time $V_R=400\text{V}$ , $I_F=15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	$t_{rr}$	-	87 124 131	-	ns
Peak reverse current $V_R=400\text{V}$ , $I_F = 15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	$I_{rrm}$	-	13.7 16.4 19.3	-	A
Reverse recovery charge $V_R=400\text{V}$ , $I_F=15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	$Q_{rr}$	-	595 995 1104	-	nC
Reverse recovery softness factor $V_R=400\text{V}$ , $I_F=15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=15\text{A}$ , $dI_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	S	-	3.6 4.3 4.5	-	

**1 Power dissipation**

$$P_{\text{tot}} = f(T_C)$$

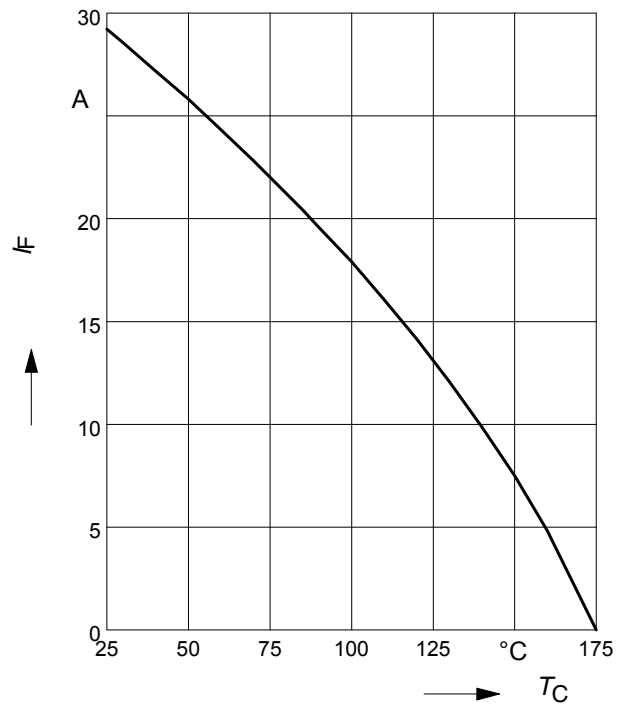
parameter:  $T_j \leq 175^\circ\text{C}$



**2 Diode forward current**

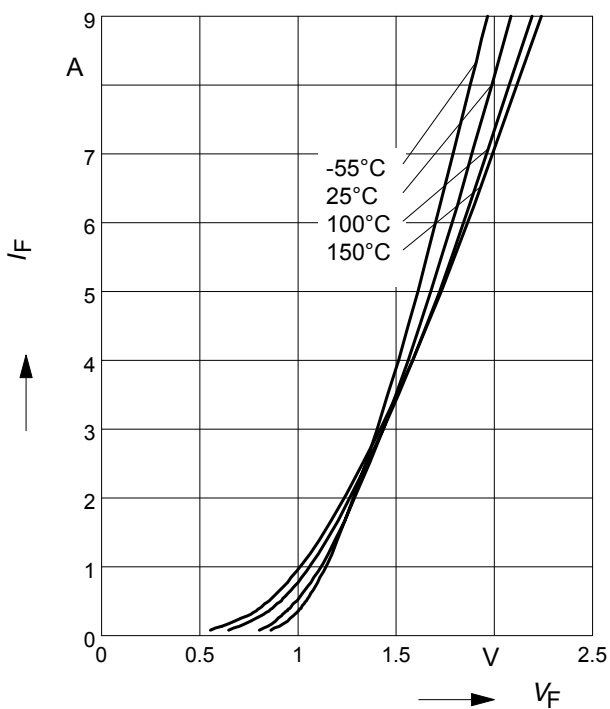
$$I_F = f(T_C)$$

parameter:  $T_j \leq 175^\circ\text{C}$



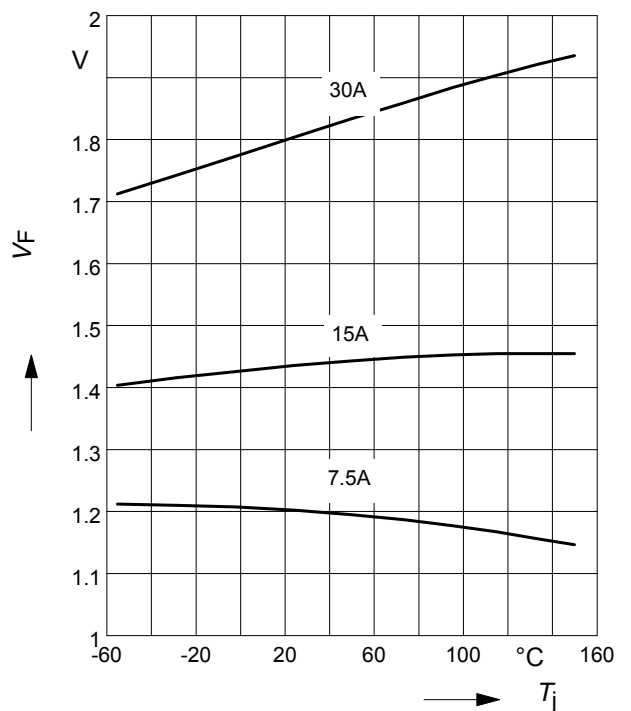
**3 Typ. diode forward current**

$$I_F = f(V_F)$$



**4 Typ. diode forward voltage**

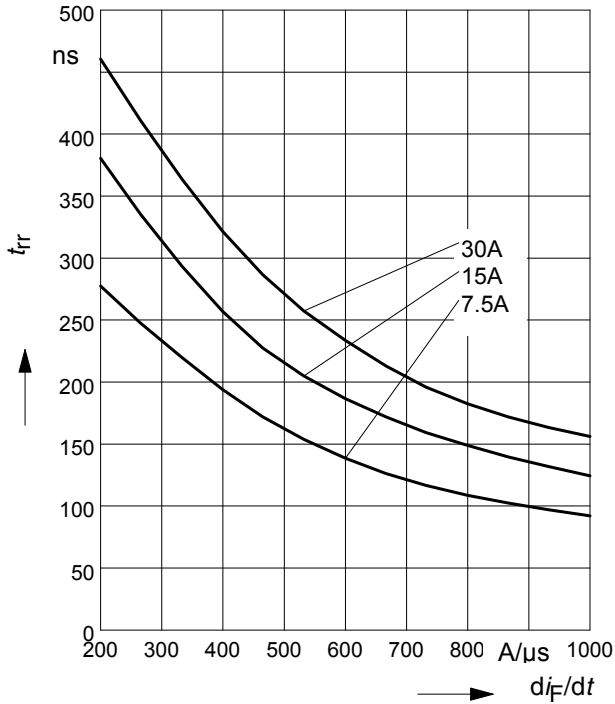
$$V_F = f(T_j)$$



**5 Typ. reverse recovery time**

$$t_{rr} = f(dI_F/dt)$$

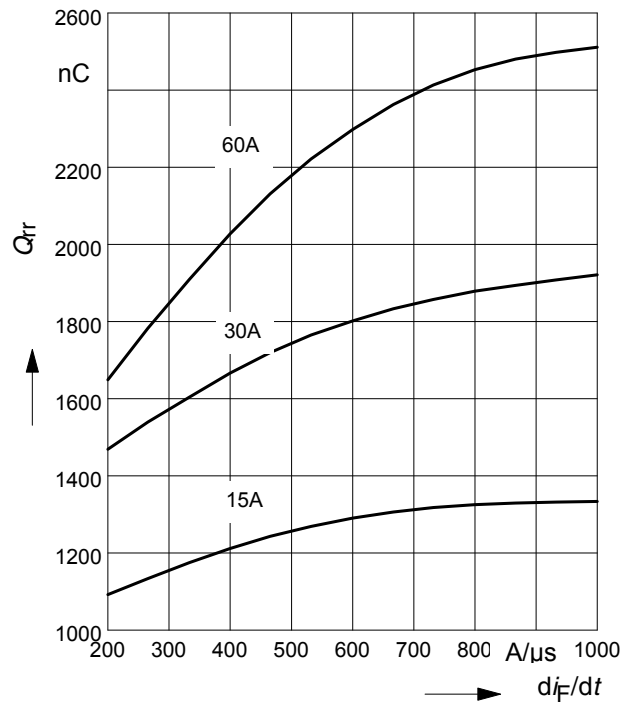
parameter:  $V_R = 400V, T_j = 125^\circ C$



**6 Typ. reverse recovery charge**

$$Q_{rr} = f(dI_F/dt)$$

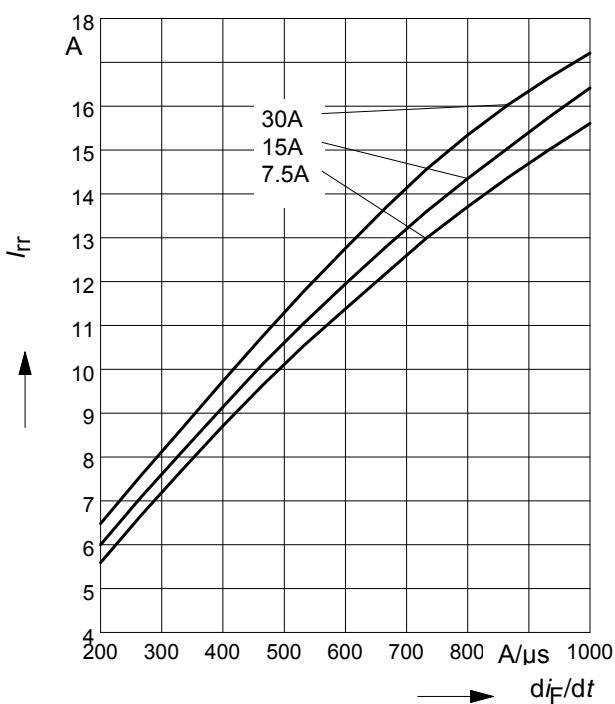
parameter:  $V_R = 400V, T_j = 125^\circ C$



**7 Typ. reverse recovery current**

$$I_{rr} = f(dI_F/dt)$$

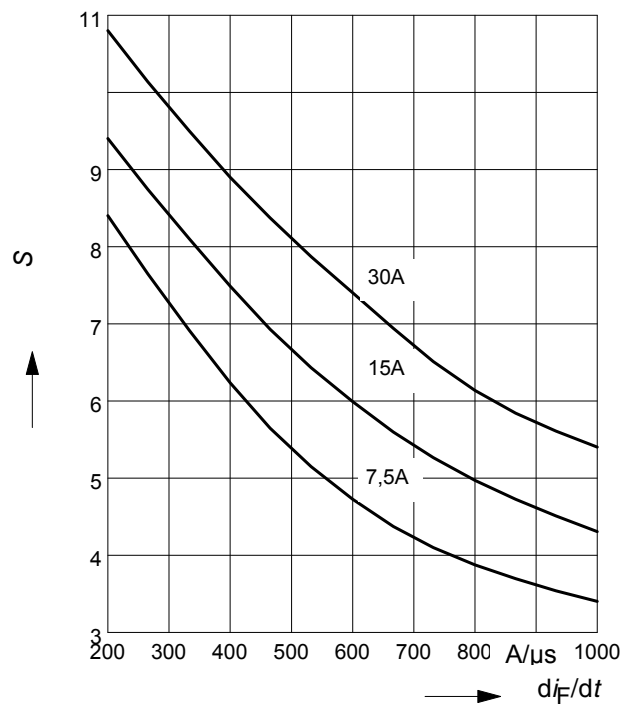
parameter:  $V_R = 400V, T_j = 125^\circ C$



**8 Typ. reverse recovery softness factor**

$$S = f(400)$$

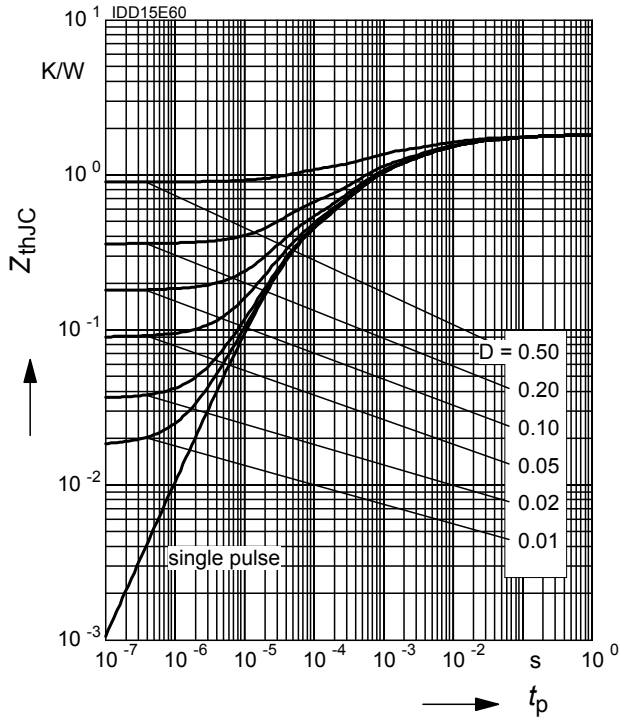
parameter:  $V_R = 400V, T_j = 125^\circ C$

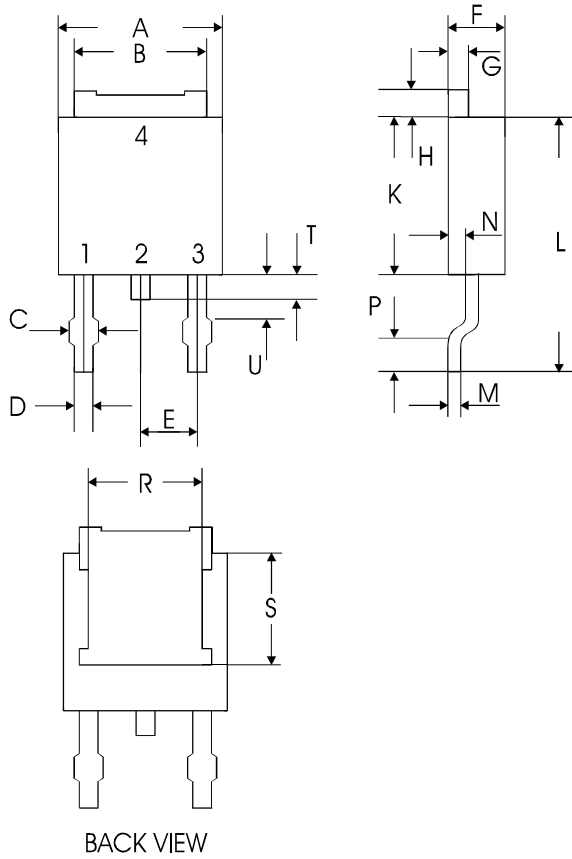


### 9 Transient thermal impedance

$$Z_{thJC} = f(t_p)$$

parameter :  $D = t_p/T$





P-T0252 (D-Pak)

symbol	dimensions			
	[mm]		[inch]	
	min	max	min	max
A	6.40	6.73	0.2520	0.2650
B	5.25	5.50	0.2067	0.2165
C	(0.65)	(1.15)	(0.0256)	(0.0453)
D	0.63	0.89	0.0248	0.0350
E	2.28		0.2520	
F	2.19	2.39	0.0862	0.0941
G	0.76	0.98	0.0299	0.0386
H	0.90	1.21	0.0354	0.0476
K	5.97	6.23	0.2350	0.2453
L	9.40	10.40	0.3701	0.4094
M	0.46	0.58	0.0181	0.0228
N	0.87	1.15	0.0343	0.0453
P	0.51	-	0.0201	-
R	5.00	-	0.1969	-
S	4.17	-	0.1642	-
T	0.26	1.02	0.0102	0.0402
U	-	-	-	-

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